

## CLAIMS

1. A gas concentration measurement instrument for measuring change in concentration of gas in a measurement region, comprising:

ultrasonic wave transmitting means for transmitting an ultrasonic wave according to an ultrasonic wave generation signal composed of a group of rectangular pulse waves;

ultrasonic wave receiving means for converting the ultrasonic wave transmitted through the gas in the measurement region into an electric signal to use it as an ultrasonic wave reception signal; and

gas concentration measuring means for measuring the signal output time when the ultrasonic wave generation signal is outputted, generating an envelope processing signal by subjecting the ultrasonic wave reception signal to an envelope extracting processing, measuring the threshold fall time when the envelope processing signal decreases below a predetermined threshold after exceeding the threshold, and measuring the difference between the threshold fall time and the signal output time as change in the gas concentration.

2. The gas concentration measurement instrument according to claim 1, wherein the difference between the threshold fall time and the signal output time linearly responds to the gas mixture ratio.

3. A gas concentration measurement method for measuring change in concentration of gas in a measurement region, comprising:

transmitting an ultrasonic wave according to an ultrasonic wave generation signal composed of a group of rectangular pulse waves;

converting the ultrasonic wave transmitted through the gas in the measurement region into an electric signal to use it as an ultrasonic wave reception signal; and

measuring the signal output time when the ultrasonic wave generation signal is outputted, generating an envelope processing signal by subjecting the ultrasonic wave reception signal to an envelope extracting processing, measuring the threshold fall time when the envelope processing signal decreases below a predetermined threshold after exceeding the threshold, and

measuring the difference between the threshold fall time and the signal output time as change in the gas concentration.